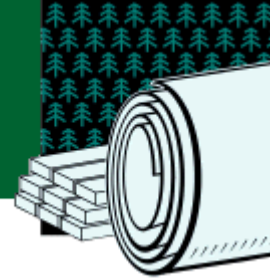


FOREST PRODUCTS

Project Fact Sheet



USE OF BORATE AUTOCAUSTICIZING TO SUPPLEMENT LIME KILN AND CAUSTICIZING CAPACITIES

BENEFITS

- Reduced dependence on causticizing and calcining units
- Increased caustic capacity
- Reduced lime kiln energy requirements
- Increased causticizing efficiency

APPLICATIONS

Boron-based autocauticizing can replace all or part of the kraft causticizing-calcining process. In this project, partial boron-based autocauticizing will be applied to kraft pulping process to provide supplemental lime kiln and causticizing capacities.



New Technology Will Increase Energy Efficiency of Kraft Chemical Recovery Process and Causticizing as well as Calcining Capacities

Boron-based autocauticizing is a new, cost-effective technology to recover kraft pulping chemicals. This technology can be used to supply either part or all of the sodium hydroxide requirements of the kraft process, supplementing or replacing the lime cycle. Because the de-carbonating reactions take place directly in the recovery boiler, instead of the lime kiln, this process reduces energy consumption and provides increased causticizing and calcining capacities.

The laboratory information provided by this study is being used to help interpret and guide on-going mill trials. Information is being obtained on process efficiency, pulp properties, black liquor properties and burning characteristics.

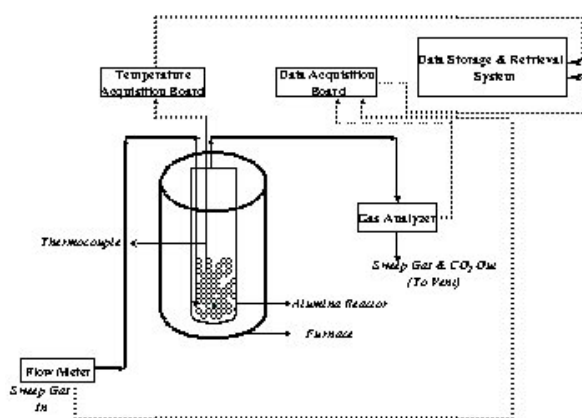
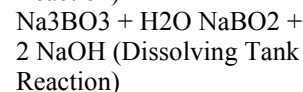
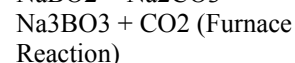
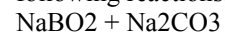


Figure 1. Laboratory Molten Salt Reactor Autocauticizing can be summarized by the following reactions.



The molten salt reactor, shown in this figure, is one of several reactors used in this study and provides data on the reaction between sodium metaborate (NaBO_2) and sodium carbonate (Na_2CO_3) trisodium borate.

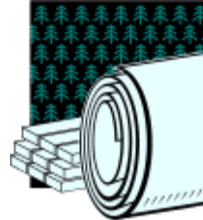
PROJECT DESCRIPTION

Goal: Define the mechanisms and controlling parameters for the borate furnace and causticizing reactions and use this knowledge to implement the technology. Boron-based autocausticizing uses sodium metaborate to react with sodium carbonate in the kraft furnace. Once the reacted salts are dissolved in the green-liquor dissolving tank, sodium hydroxide is formed, and the sodium metaborate is regenerated. Recent studies suggest that this technology has the potential to provide more energy-efficient hydroxide production, increase the causticizing equilibrium, and, when used in conjunction with the conventional lime cycle, increase the causticizing/calcining capacity.

This work will focus on understanding the effects of partial boron based autocausticizing on de-carbonating and causticizing reactions and quantifying the effects of autocausticizing on the recovery cycle. Additionally, researchers will determine the effects of this technology on the kraft pulping reactions and digester capacity.

PROGRESS & MILESTONES

- Exploratory field trials indicated:
 - A higher ration of Sodium:Boron yielded a more efficient reaction;
 - Fume present in boiler sections decreased; and
 - Increased efficiency in subsequent causticizing reactions (two times as effective as was previously believed).
- Initial studies on the borate-carbonate furnace reactions and the effects of borate on black liquor evaporation are underway.
- The effect of borate on causticizing kinetics and kraft pulping will be determined.



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April 2001